

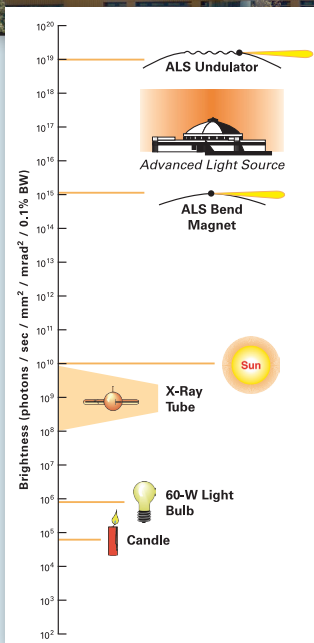
QUICK FACTS



The Advanced Light Source (ALS) is a third-generation synchrotron, a specialized particle accelerator that generates bright beams of x rays for scientific research. It is located in a building originally designed in the 1930s by Arthur Brown, Jr.—architect of the Coit Tower in San Francisco—to house Ernest O. Lawrence's 184-inch cyclotron. In 1987, a \$99.5-million construction project, funded by the US Department of Energy's Office of Basic Energy Sciences, began to reconfigure the building to accommodate the ALS accelerator and beamlines. Completed in 1993, the ALS is a national user facility that now attracts more than 2000 researchers and students annually from around the world.

HOW THE ALS WORKS:

Electron bunches traveling nearly the speed of light, when forced into a circular path by magnets, emit bright ultraviolet and x-ray light that is directed down beamlines to experiment endstations.



HOW BRIGHT IS IT?

The ALS produces light in the x-ray region of the electromagnetic spectrum that is one billion times brighter than the sun. This extraordinary tool offers unprecedented opportunities for state-of-the-art research in biology, chemistry, physics, and materials, energy, and environmental sciences. Ongoing research includes semiconductors, polymers, superconductors, magnetic materials, biological macromolecules (Proteins, etc.), 3D biological imaging, chemical reaction dynamics, and atomic and molecular structure.

ABOUT THE ACCELERATOR

Number of electrons in each bunch	7.5 billion
Time between electron bunches	2×10^{-9} sec
Size of the electron beam	$\sim 0.20\text{mm} \times 0.01\text{mm}$ (the width of a human hair)
Distance electrons travel in the booster ring (in 0.45 sec)	135,000 km
Electron revolutions around the storage ring per second	1.5 million
Energy of electrons in the storage ring	1.9 GeV
Speed electrons travel at their highest velocity	299,792,447 meters/sec (that's 99.999996% the speed of light!)
Aluminum foil used per year:	20,928 sq ft

USER STATS

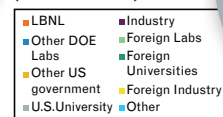
50-100

Users on site at any one time

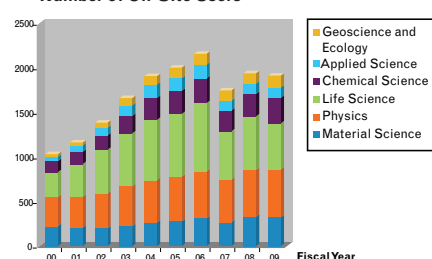
1 hour to 3 weeks:

Average stay of users

ALS User Institutions
(1918 on-site users)



Number of On-Site Users



FACILITY FACTS

≈ 210

Total ALS staff

>3,100

Refereed publications since 2005

\$49m

Operating budget for FY2010

5842.6 h

Number of operating hours

39 + beam test facility

Number of beamlines